What is claimed is:

1. A method for fabricating a semiconductor device, the method comprising:

forming a first conductive layer for a first electrode on a semiconductor substrate;

forming a dielectric layer on the first conductive layer;

forming a second conductive layer for a second electrode on the dielectric layer;

removing portions of the second conductive layer and the dielectric layer; and

performing a thermal process on the second conductive layer and the dielectric layer at a temperature of at least about 400°C.

2. The method of claim 1, wherein the thermal process comprises:

heating the second conductive layer and the dielectric layer to a first temperature in the range of about 450°C to 600°C in an inert gas atmosphere; and

then, heating the second conductive layer and the dielectric layer to a second temperature in the range of about 350°C to 450°C in a gas atmosphere including oxygen.

3. The method of claim 1, wherein forming the dielectric layer is preceded by:

depositing a seed layer on the first conductive layer; and

crystallizing the seed layer.

4. The method of claim 1, wherein the performing the thermal process comprises heating the dielectric layer and the second conductive layer at a temperature in the range of about 450°C to 600°C in an inert gas atmosphere.

5. The method of claim 1, wherein performing the thermal process comprises:

heating the dielectric layer and the second conductive layer at a first temperature in the range of about 350°C to 450°C in a gas atmosphere including oxygen; and

then, heating the dielectric layer and the second conductive layer at a second temperature in the range of about 450°C to 600°C in an inert gas atmosphere.

6. The method of claim 1, wherein performing the thermal process comprises:

heating the dielectric layer and the second conductive layer at a first temperature in the range of about 650°C to 700°C in an inert gas atmosphere; and

then, heating the dielectric layer and the second conductive layer at a second temperature in the range of about 350°C to 450°C in a gas atmosphere including oxygen.

7. The method of claim 1, wherein performing the thermal process comprises heating the dielectric layer and the second conductive layer at a temperature in the range of about 650°C to 700°C in an inert gas atmosphere.

8. The method of claim 1, wherein performing the thermal process comprises:

heating the dielectric layer and the second conductive layer at a first temperature in the range of about 350°C to 450°C in a gas atmosphere including oxygen; and

then, heating the dielectric layer and the second conductive layer at a second temperature in the range of about 650°C to 700°C in an inert gas atmosphere.

9. The method of claim 1, wherein the first conductive layer comprises at least one material selected from the group consisting of platinum (Pt), ruthenium (Ru), iridium (Ir), rhodium (Rh), and/or osmium (Os).

10. The method of claim 9, wherein the second conductive layer comprises a same material as the first conductive layer.

11. The method of claim 1, wherein forming the dielectric layer comprises forming a tantalum oxide layer.

12. The method of claim 1, wherein forming the dielectric layer comprises depositing tantalum oxide at a temperature in the range of about 380°C to 500°C using chemical vapor deposition (CVD).

13. The method of claim 1, wherein removing portions of the second conductive layer and the dielectric layer comprises dry etching the second conductive layer and the dielectric layer.

14. The method of claim 1 wherein performing the thermal process comprises performing the thermal process on the second conductive layer and the dielectric layer after removing portions of the second conductive layer and the dielectric layer.

15. A method for fabricating a semiconductor device, the method comprising:

forming a first conductive layer for a first electrode on a semiconductor substrate;

forming a tantalum oxide layer on the first conductive layer;

forming a second conductive layer for a second electrode on the tantalum oxide layer;

removing portions of the second conductive layer and the tantalum oxide layer; and

performing a thermal process to reduce an interface stress between the second conductive layer and the tantalum oxide layer and to cure the tantalum oxide layer, while maintaining the tantalum oxide layer in a substantially amorphous state during and after the thermal process.

16. The method of claim 15, wherein performing the thermal process comprises:

heating the tantalum oxide layer and the second conductive layer at a first temperature in the range of about 450°C to 600°C in an inert gas atmosphere; and

then, heating the tantalum oxide layer and the second conductive layer at a second temperature in the range of about 350°C to 450°C in a gas atmosphere including oxygen.

17. The method of claim 16, wherein heating at the first temperature and heating at the second temperature are performed *in situ*.

18. The method of claim 15, wherein performing the thermal process comprises heating the tantalum oxide layer and the second conductive layer at a temperature in the range of about 450°C to 600°C in an inert gas atmosphere.

19. The method of claim 15, wherein the thermal process comprises:

heating the tantalum oxide layer and the second conductive layer at a first temperature in the range of about 350°C to 450°C in a gas atmosphere including oxygen; and

then, heating the tantalum oxide layer and the second conductive layer at a second temperature in the range of about 450°C to 600°C in an inert gas atmosphere.

20. The method of claim 15, wherein heating at the first temperature and heating at the second temperature are performed *in situ*.

21. The method of claim 15, wherein the first conductive layer comprises at least one material selected from the group consisting of Pt, Ru, Ir, Rh, and/or Os.

22. The method of claim 21, wherein the second conductive layer comprises a same material as the first conductive layer.

23. The method of claim 15, wherein forming the tantalum oxide layer comprises depositing tantalum oxide at a temperature in the range of about 380°C to 500°C using chemical vapor deposition.

24. A method for fabricating a semiconductor device, the method comprising:

forming a first conductive layer for a first electrode on a semiconductor substrate;

forming a tantalum oxide layer on the first conductive layer;

forming a second conductive layer for a second electrode on the tantalum oxide layer;

removing portions of the second conductive layer and the tantalum oxide layer; and

performing a thermal process to reduce interface stress between the second conductive layer and the tantalum oxide layer and to crystallize at least a portion of the tantalum oxide layer.

25. The method of claim 24, wherein performing the thermal process comprises:

heating the second conductive layer and the tantalum oxide layer at a second temperature in the range of about 650°C to 700°C in an inert gas atmosphere; and

then, heating the second conductive layer and the tantalum oxide layer at a second temperature in the range of about 350°C to 450°C in a gas atmosphere including oxygen.

26. The method of claim 25, wherein heating at the first temperature and heating at the second temperature are performed *in situ*.

27. The method of claim 24, wherein performing the thermal process comprises heating the second conductive layer and the tantalum oxide layer at a temperature in the range of about 650°C to 700°C in an inert gas atmosphere.

28. The method of claim 24, wherein performing the thermal process comprises:

heating the second conductive layer and the tantalum oxide layer at a first temperature in the range of about 350°C to 450°C in a gas atmosphere including oxygen; and

then, heating the second conductive layer and the tantalum oxide layer at a second temperature in the range of about 650°C to 700°C in an inert gas atmosphere.

29. The method of claim 28, wherein heating at the first temperature and heating at the second temperature are performed *in situ*.

30. The method of claim 24, wherein the first conductive layer comprises at least one material selected from the group consisting of Pt, Ru, Ir, Rh, and/or Os.

31. The method of claim 30, wherein the second conductive layer comprises a same material as the first conductive layer.

32. The method of claim 24, wherein forming the tantalum oxide layer comprises depositing tantalum oxide at a temperature in the range of 380°C to 500°C by a CVD method.

33. A method for fabricating a semiconductor device, the method comprising:

forming a first conductive layer for a first electrode on a semiconductor substrate;

forming a seed layer on the first conductive layer;

crystallizing the seed layer;

forming a tantalum oxide layer on the crystallized seed layer;

forming a second conductive layer for a second electrode on the tantalum oxide layer;

removing portions of the second conductive layer and the tantalum oxide layer; and

performing a thermal process to reduce an interface stress between the second conductive layer and the tantalum oxide layer and to cure the tantalum oxide layer.

34. The method of claim 33, wherein performing the thermal process comprises:

heating the second conductive layer and the tantalum oxide layer at a first temperature in the range of about 450°C to 600°C in an inert gas atmosphere; and

then, heating the second conductive layer and the tantalum oxide layer at a second temperature in the range of about 350°C to 450°C in a gas atmosphere including oxygen.

35. The method of claim 34, wherein heating at the first temperature and heating at the second temperature are performed *in situ*.

36. The method of claim 33, wherein forming the seed layer comprises forming a seed layer having a thickness in the range of about 30Å to 60Å.

37. The method of claim 36, wherein crystallizing the seed layer comprises heating the seed layer at a temperature in the range of 650°C to 750°C.

38. The method of claim 33, wherein the first conductive layer comprises at least one material selected from the group consisting of Pt, Ru, Ir, Rh, and/or Os.

39. The method of claim 38, wherein the second conductive layer comprise a same material as the first conductive layer.

40. The method of claim 33, wherein forming the tantalum oxide layer comprises depositing tantalum oxide at a temperature in the range of 380°C to 500°C using chemical vapor deposition.

41. The method of Claim 33 wherein forming the seed layer comprises forming a seed layer of a tantalum oxide layer